INDUMART Canada
www.indumart.com

Smart Level Transmitter

SERIES: LTS350

- MEASURES LIQUID LEVEL
- MEASURES DENSITY AND INTERFACE
- 0.25% ACCURACY
- OPEN OR CLOSED TANK APPLICATIONS
- 4-20 mA OUTPUT & DIGITAL COMMUNICATION
- HART PROTOCOL INSTRUMENT
- LOCAL ZERO AND SPAN ADJUSTMENTS
- 16:1 RANGEABILITY
- MINIMUM SPAN 22 mm (0.9")
- MAXIMUM SPAN 3048 mm (120")
- 4-DIGIT LCD DISPLAYS LEVEL OR DENSITY
- AUTOMATIC TEMPERATURE COMPENSATION
- LONG-TERM STABILITY AND SERVICE LIFE
- INTRINSICALLY SAFE OR EXPLOSION PROOF

INTRODUCTION

Utilizing the smart technology in manufacturing of level transmitters for open or closed tank applications resulted in introduction of a new transmitter with a lot more features than the old analogue model.

When deciding about purchasing analogue or smart transmitters for level measurements, you will find that smart transmitters have higher accuracy and precision along with faster dynamic response than the analogue ones. This will give the smart models an advantage to produce tighter process control.

Moreover, smart transmitters reduce commissioning by allowing fast identification, fast configuration, fast loop tuning and improved self diagnostics. They can be configured and serviced in the field or from a remote location, such as the control room, along the 4-20 mA line. This ease of field service can be very important to quick field troubleshooting and improves maintenance issues.

Smart transmitters communicate through HART (Highway Addressable Remote Transducer) protocol, a platform ready for complete digital integration of your process system. The HART communication protocol is capable of performing simultaneous analogue and digital communications. HART protocol allows multi-drop instrument installation, operation over remote telephone communication lines and transmission of multiple variables when operating digitally.

SMART LTS350

Indumart LTS350 Series of Smart Level Transmitters are two-wire microprocessor-based instruments, which can measure liquid levels, density and interface levels in closed or open tanks. It converts buoyant force exerted by a displacer immersed in a liquid to a proportional current signal using a mechanical force transmission device based on a torque tube and a piezoresistive sensor.

The measuring cell contains the sensor and transmits pressure to the electronics. Thermal drift is automatically compensated using the signal from a thermistor integrated into the pressure sensor. The high accuracy sensor coupled with the temperature compensation feature give a measurement precision, which is more than adequate for even the most demanding applications. Based on these readings a 4-20 mA output signal directly or inversely proportional to the measured parameter is generated and displayed on the 4-digit LCD indicator. Digital communication for remote calibration and monitoring is also provided, superimposing a digital signal on the same pair of wires that carries the 4-20 mA signal.

When the instrument works as a level transmitter, its range is always defined by the displacer's length, and while the instrument measures the density or interface, its displacer is completely immersed in the fluid(s). This means that the piezoresistive sensor establishes the working limits of the transmitter.

The nominal output resolution of the transmitter is better (smaller) than 0.01% of the nominal span. The best resolution, when measuring density or interface, is obtained when working with the nominal span of the transmitter (1.42). The minimum span used for density or interface measurement is 0.1 (in open tanks the top fluid density is 0). By reducing the measuring span (density difference), the measurement resolution (R_u) will approach to its worst level.
$R_u = 0.01 \times 0.75 \times 1.42$ / measuring span.

These transmitters can be configured utilizing any of the three following methods: **(1)** with having the capability of digital communication (Bell 202 standard FKS), they may be configured using a hand-held terminal with HART protocol, **(2)** by a PC with a dedicated interface and the Indumart smart configuration software (STS300), **(3)** locally configuring the instrument (zero and span) by means of 2 pushbuttons on the transmitter. The 4-digit LCD indicator displays the measured reading in meter, kg/l or the percentage of the measuring span.

Due to the materials and technology used in the construction of these pressure transmitters, these instruments are very reliable. The electronic circuit boards meet the electromagnetic compatibility (EMC) requirements of EN50081-2 and EN50082-2. The electronic boards used in construction of Series LTS350 transmitters are intrinsically safe. Explosion proof construction is also available as an optional feature.

HINTS TO THE BUYERS

1) The first question when purchasing a pressure actuated level transmitter is the **TYPE**: Smart or Analogue? Smart transmitters have remarkable advantages over the analogue ones. These features have been mentioned in the introduction part of this brochure. Cost comparison is also important, since the initial cost of a smart transmitters is higher than that of an analogue model, but in future, you will save on installation, start-up, calibration, spare parts inventory and maintenance costs.

2) **ACCURACY** of the transmitter utilized in a process is often very important. However, because each process has its own characteristics, in many cases, increasing precision after a certain point will not improve performance.

3) Wide **TURNDOWN RATIO** is an asset when you are concerned about keeping the number of spare transmitter in the stock. In order to receive the most accurate reading from any pressure transmitter available in the market, choose the one with the closest nominal range to your application, and try not to use the turndown ratio in high extend, since the accuracy is based on the full scale, and increasing the turndown ratio decreases accuracy of the instrument.

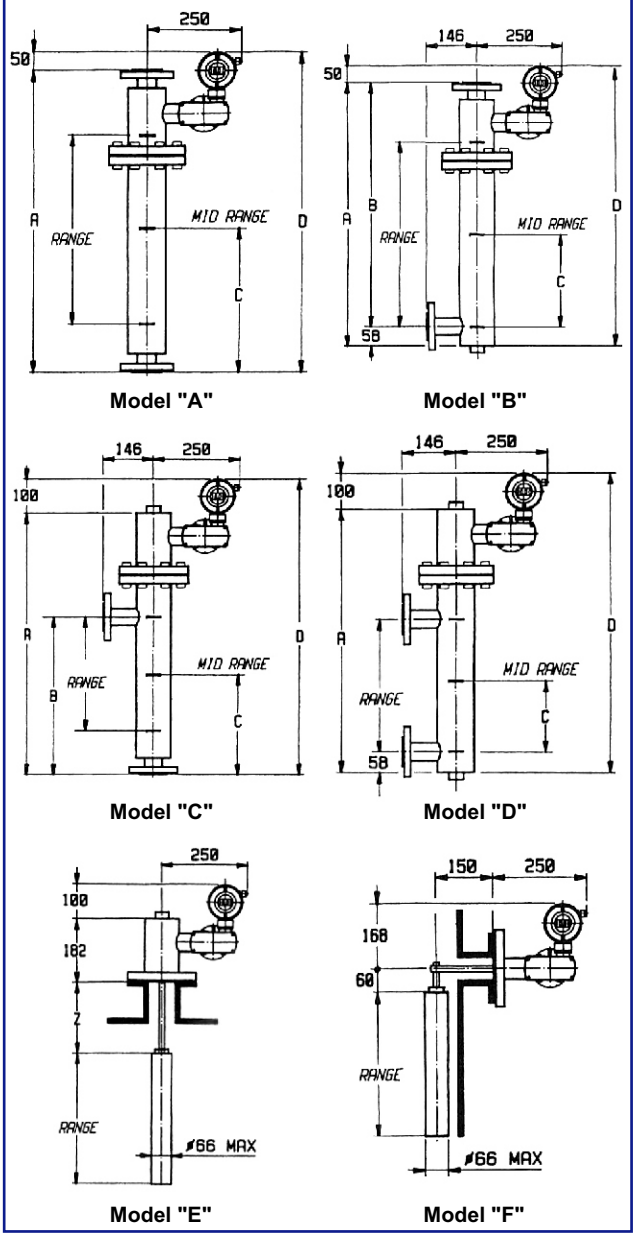
4) Among the advantages of using **HART** protocol is the fact that different brands of smart transmitters can use the same hand-held terminal. For example ROSEMOUNT hand-held terminal can program Indumart transmitters.

SPECIFICATIONS

Performance: Unless otherwise stated the performance specifications are at 20˚C and nominal range, and errors are shown as a percentage of the nominal span.

Accuracy	Better than 0.25% including linearity, repeatability and hysteresis errors
Resolution	≤0.01%
Dead Band	Negligible
Measuring Span	6.25% to 100% of the nominal span (See the Order Code Section for Ranges)
Adjustments	Zero & Span
Zero Adjustment	Digital Calibration ±15%
Damping	Digitally adjustable from 0 to 15 sec.
Min. Response Time	0.1 second
Transfer Function	Linear
Output Signals	4...20 mA, 2-wire; Digital (Bell 202 Standard FSK) using HART protocol
Reverse Output	Selection via software
Fail-safe Output	In case of malfunction the analogue output is forced to the fail-safe state of 3.8 or 23.2 mA (selectable)
Thermal Drift	Specified for -10 to 65˚C range,
Zero:	±0.1% / 10˚K
Span:	±0.1% / 10˚K at nominal range
Power Supply	12.5 to 30 VDC with no load
Supply vs. Load	18.25 VDC for up to 250 Ω 24 VDC for up to 500 Ω 30 VDC for up to 760 Ω
Power Supply Effect	Negligible between 12.5 and 30 VDC
Display	4-digit LCD
Measuring Units	Meter or % of level, kg/l for density
Case	Die cast Aluminum alloy, finished with epoxy resin
Displacer Cage	316 st. steel or carbon steel
Flanges	316 st. steel or carbon steel
Torque Tube	316 st. steel + Hastelloy C all in Hastelloy C (option)l
Sensing Element	Displacer and torque tube
Process Connections	See the Order Code Section
Displacement	1200 ml
Max. Displacer dia.	66 mm
Displacer Rating	Up to 813 mm: PN100 - ASA 600, from 1219 mm: PN40 - ASA300
Electric Connection	½" NPT and cable gland PG 13.5 for 7 to 12 mm diameter cable
Environ. Protection	IP-66, protection against sea waves and dust proof; suitable for tropical environment to DIN 50.015 standard
Explosion Protection	Intrinsic safety EEx ia IIC, T6, T5, T4 For Zone 0 groups IIA, IIB, IIC; Explosion proof EEx d IIC, T6, T5, T4
Temp. Medium	-20...+150˚C (350˚C with finned arm)
Housing	-20...+80˚C
Storage	-20...+90˚C
Relative Humidity	0 to 100%
LCD Display Reading	-10...+70˚C
EMC Emission	EN50081-2
Susceptibility	EN 50082-2
Net Weight	See the Dimension and Weight Table

DIMENSIONS (mm)



DIMENSIONS(mm) AND WEIGHT (kg)

Model	Parameter	Range (mm) 356	813	1219	1524	1829	2134	2438	3048
A	A	651	1108	1514	1819	2124	2429	2733	3343
	C	298	527	730	882	1035	1187	1339	1644
	D	701	1158	1564	1869	2174	2479	2783	3393
	weight	33	37	41	44	47	50	53	59
B	A	601	1058	1464	1769	2074	2379	2683	3293
	B	543	1000	1406	1711	2016	2321	2625	3235
	C	178	407	610	762	915	1067	1219	1524
	D	651	1108	1514	1819	2124	2429	2733	3343
	weight	33	37	41	44	47	50	53	59
C	A	766	1223	1629	1934	2239	2544	2848	3458
	B	465	922	1328	1633	1938	2243	2547	3157
	C	287	515	718	871	1023	1176	1328	1633
	D	866	1323	1729	2034	2339	2644	2948	3558
	weight	35	39	43	46	49	52	55	61
D	A	716	1173	1579	1884	2189	2494	2798	3408
	C	178	407	610	762	915	1067	1219	1524
	D	816	1273	1679	1984	2289	2594	2898	3508
	weight	35	39	43	46	49	52	55	61
Displacer Diameter		63.5	43	35	31.8	28.6	26.9	25	22
E	weight	25							
F	weight	22							

ORDER CODE

SMART LEVEL TRANSMITTER (Please state the density, pressure and temperature of the process liquid)

Model: **LTS350 -** [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

NOMINAL RANGE
- 356 mm (14") 1
- 813 mm (32") 2
- 1219 mm (48") 3
- 1524 mm (60") 4
- 1829 mm (72") 5
- 2134 mm (84") 6
- 2438 mm (96") 7
- 3048 mm (120") 8
- Special 9

DISPLACER CHAMBER
- Model A - Top - bottom A
- Model B - Top - side B
- Model C - Side - bottom C
- Model D - Side - side D
- Model E - Top E
- Model F - Side F

DISPLACER CHAMBER & FLANGE MATERIAL
- Carbon steel C
- 316 St. steel S

CONNECTING FLANGES
- 1 ½" ANSI 150 RF (models A, B, C and D only) 1
- 1 ½" ANSI 300 RF (models A, B, C and D only) 2
- 1 ½" ANSI 600 RF (models A, B, C and D only) 3
- 2" ANSI 150 RF (models A, B, C and D only) 4
- 2" ANSI 300 RF (models A, B, C and D only) 5
- 2" ANSI 600 RF (models A, B, C and D only) 6
- 3" ANSI 300 RF (model E only) 7
- 4" ANSI 300 RF (models E and F only) 8

Z DIMENSION
- All models except "E" 1
- 60 mm (model E only) 2
- 200 mm (model E only) 3
- 300 mm (model E only) 4
- 400 mm (model E only) 5
- 500 mm (model E only) 6
- Special (model E only) 9

TORQUE TUBE & FINNED ARM
- Standard torque tube 1
- Standard torque tube + finned arm 2
- Torque tube in Hastelloy C 3
- Torque tube in Hastelloy C + finned arm 4

POSITION OF THE TRANSMITTER CASE
- Case on right 1
- Case on left 2

EXPLOSION PROTECTION
- Intrinsically safe to EEx ia ... (standard) 1
- Explosion proof to EEx d ... (option) 2

CALIBRATION
- Nominal range (standard) 1
- Configured for a specific range (optional); please supply the parameters 2

INDUMART INC.
1-15 W. Pearce St., Richmond Hill, Ont. L4B 1H6, Canada
Phone: (905) 707-9998 Fax: (905) 707-8484 E-mail: Sales@Indumart.com